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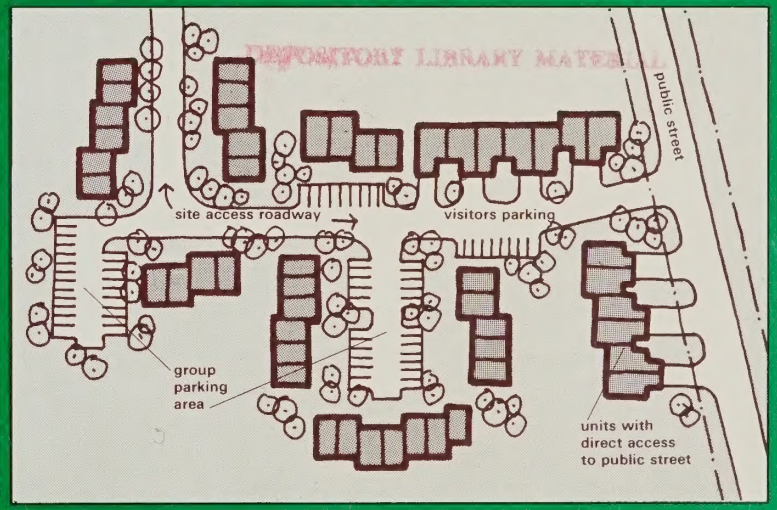
Parking Guidelines for Medium Density Housing



Ontario
Ministry of Municipal Affairs and Housing

July 1981

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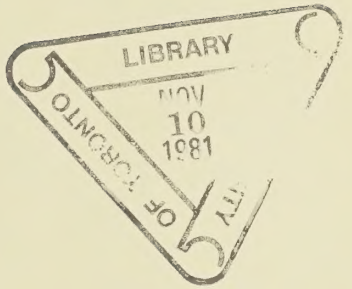
PARKING GUIDELINES FOR MEDIUM DENSITY HOUSING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Parking Guidelines for Medium Density Housing

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PREFACE

These guidelines are a supplement to "Site Planning Guidelines for Medium Density Housing", which the Ministry of Housing published in January 1980.

At the time the guidelines were prepared, it was recognized that the parking standards were the best available but not as accurate and complete as they should be. The provision of adequate parking is critical to site planning for medium density housing. Excess parking is both costly and wasteful of land.

The purpose of these guidelines is to enable municipalities to better evaluate the amount of resident, visitor and recreational vehicle parking required for medium density housing developments. There is a discussion of the various factors which should be considered in the evaluation of parking demand and the presentation of a methodology by which suitable standards can be established for different types of medium density housing projects in various locations within a municipality.

Municipalities, planners, developers, builders, engineers and other groups directly involved in the planning, development and approval of medium density housing were consulted in the preparation of this report. These consultations were, as always, beneficial.

G. Keith Bain
Director

July 1981

1. INTRODUCTION

BACKGROUND

These guidelines for the evaluation of medium density housing parking requirements are a supplement to the "Site Planning Guidelines for Medium Density Housing" published by the Ministry of Housing in January 1980. Therefore, they are addressed to Ontario municipalities within the population range of 10,000 to 100,000 people and to housing projects within the density range of 22 units per hectare (9 units per acre) to 90 units per hectare (36 units per acre).

Seventy-three municipalities within this population category were surveyed. Forty-three of the municipalities were in the 10,000-25,000 range, 18 were in the 25,000-50,000 range, and 12 in the 50,000-100,000 range.

Forty-five municipalities were in Central Ontario, 8 in Southwestern Ontario, 9 in Southeastern Ontario and 11 in Northern Ontario.

The density category comprises the whole range of housing forms from small single detached houses to apartment buildings served by elevators. The majority of the housing units in this density range however, are rowhouses and walk-up apartments.

The provision of parking is a critical factor in housing development at these densities for a variety of reasons. Parking standards, particularly the amount and form and the location of parking, are major determinants of housing cost, environmental quality, safety and convenience.

Some of the serious consequences of an incorrect assessment or implementation of parking requirements are:

- An inordinate amount of parking required can render a housing project, particularly a low cost development, financially unfeasible;
- Excessive standards for surface parking can reduce the available open space below a desirable level or create building forms that disrupt the urban fabric;
- Unsuitable parking locations can create security and safety problems and cause a misuse of parking facilities, due to a lack of convenience or poor visibility;
- Insufficient parking can produce traffic hazards on adjacent public streets, block driveways, reduce the parking possibilities for visitors, and clutter the landscape;
- Rigid dimensional requirements can produce expensive buildings due to the necessity for uneconomical structural spans;

- Exorbitant parking requirements can attract additional traffic by off-site patrons making use of the excess parking facilities;
- Poor parking access can create vehicular/ pedestrian conflicts;
- Inadequate separation and screening can create visual, noise and air pollution; and
- Improper implementation procedures for parking standards can produce inflexibility or uncertainty, results which are undesirable both for developers and neighbouring residents.

PRINCIPLES

The development of these guidelines was based on the premise that parking demand varies not only from municipality to municipality but also within a municipality. Factors that might affect parking standards have been identified as:

- location of building in relation to the core area;
- location of building in relation to transit;
- location of building in relation to major employment opportunities;
- type of road on which project has frontage;
- tenure of development;
- form of housing units;
- size of housing units;
- size of housing development; and
- income of occupants (This is a factor that municipalities generally cannot determine in advance).

The guidelines are intended to enable municipalities to determine their own standards appropriate to the specific circumstances and policy priorities, by correlating relevant factors. The guidelines do not recommend specific standards for general adoption.

HOW TO USE THE GUIDELINES

Municipal parking standards should reflect special circumstances as well as changing lifestyles that affect car ownership and car usage. Municipalities are encouraged to consider innovative approaches to deal with such phenomena as the sharing of parking facilities between different uses, designing for smaller cars, or tandem parking arrangements for the second family car.

Section 2 outlines parking demand and describes the correlation between certain factors and parking need on the basis of survey results.

Section 3 discusses alternative ways of responding to this parking demand on the basis of a policy decision regarding the quality and level of service.

Section 4 lists design considerations that influence the use of the parking facilities and, therefore, the effective provision of parking.

Section 5 describes the available and the recommended implementation procedures.

Section 6 combines the considerations of the previous sections in a step by step approach to establish parking regulations for medium density housing projects.

2. PARKING DEMAND

PARKING SUPPLY AND DEMAND

The demand for parking may be defined as the number of automobile drivers desiring to park in a given area during a specified time period which is often expressed as the number during the peak hour of the day. The given area in the context of this report includes the development site, the adjacent streets, as well as parking facilities within reasonable walking distance.

This general definition of parking demand has to be modified in the case of a residential development where resident parking spaces are an integral part of the unit (e.g. rowhousing) or where resident parking spaces are specifically assigned to each dwelling unit and not available for use even when unoccupied. In these cases, parking demand may be defined as the total number of vehicles owned by the residents plus the peak demand for visitor parking spaces.

Peak demand for various types of parking occurs at different times. Peak residential parking demand occurs when all the residents of a development are at home, usually at night time. Peak visitor parking demand usually occurs during the weekend between the hours of 8:00 p.m. and 12:00 midnight. The demand for recreational vehicle parking is generally higher during the winter season than the summer season.

This section of the report estimates the parking demand and assesses the impact of various factors on parking demand based on the results of two surveys:

- A survey of 73 municipalities having a population in the range of 10,000 to 100,000. Forty-eight municipalities (66%) responded and the results of the survey are summarized in Appendix B.
- A survey of residents from across the Province. A sample was selected to be representative of the various municipal sizes (10-25,000, 25-50,000, 50-100,000), the different municipal locations (Northern Ontario, Southern Ontario, within influence of Metropolitan Toronto), the range of housing forms, as well as the forms of tenure. Over 5,000 questionnaires were delivered and 523 were returned.

  According to 1976 statistics, there were 93,000 rowhouses and apartments in all Ontario municipalities in the 10-100,000 population range. This represents 26% of the total housing stock of these municipalities.

  The overall survey return corresponds to a 95% confidence limit with a precision of ±5%. While the overall return is significant statistically, limited returns from certain geographic areas, or housing types, made the establishment of some of the detailed correlations originally contemplated unreliable.

  The results of the resident survey are summarized in Appendix C.

DISCUSSION OF SURVEY RESULTS

A number of significant conclusions can be drawn from the two surveys:

- Except for rental apartments, resident vehicle ownership is higher than existing bylaw requirements.
- Resident vehicle ownership is higher in condominium dwelling units than in rental dwelling units.
- Resident vehicle ownership for rental accomodation is 8.1% higher in townhouses than in apartments, and for condominium accommodation is 4.0% higher in townhouses than in apartments.

SURVEYS

FORM	RESIDENT	MUNICIPAL BYLAWS
Twnhs. Rental	1.33	1.29
Twnhs. Condo	1.57	1.33
Apart. Rental	1.23	1.29
Apart. Condo	1.51	1.27

- Truck and van ownership is considerably higher in Northern Ontario than in the rest of the province.

SIZE & LOCATION OF MUNICIPALITY	TRUCKS/VANS (as percentage of total vehicle ownership)
Northern Ontario	
10-24,999	17.8%
25-49,999	13.0%
50-100,000	16.2%
Southern Ontario	
10-24,999	—
25-49,999	12.3%
50-100,000	5.9%
Metro Region	
10-24,999	—
25-49,999	4.5%
50-100,000	7.3%

- Total resident vehicle ownership, as well as car ownership, is highest in 3 bedroom units and lowest in 1 bedroom units. The difference is 23.7% for all vehicles and 24.0% for cars.
- Total resident vehicle ownership, as well as car ownership, is highest where household income is over $30,000 and lowest where household income is under $10,000. The difference is 36.8% for all vehicles and 59.8% for cars.
- Transit proximity does not reduce vehicle ownership. The highest ownership has been found where walking time to transit stops is 1 minute and the lowest ownership where walking time is over 15 minutes.
- Level of transit service (frequency) does not seem to influence vehicle or car ownership. The lowest ownership was found at a transit frequency of 15-19 minutes and the highest at a transit frequency of 10-14 minutes.

- There is no general relationship between vehicle ownership and size of municipality. In Northern Ontario and the Metro Region, the highest ownership was found in the 10-24,999 category and the lowest in the 50-100,000 category, with differences of 92.8% and 11.3% respectively. In Southern Ontario (exclusive of Metro), the reverse occurs. Municipalities in the 50-100,000 category have a 36% higher vehicle ownership ratio than those in the 10-24,999 category.
- Vehicle ownership by size and location of municipalities is ranked as follows:

1. 2.14 Northern Ontario (10-24,999)
2. 1.77 Northern Ontario (25-49,999)
3. 1.67 Metro Region (10-24,999)
4. 1.57 Metro Region (25-49,999)
5. 1.50 Metro Region (50-100,000)
6. 1.36 Southern Ontario (50-100,000)
7. 1.30 Southern Ontario (25-49,999)
8. 1.11 Northern Ontario (50-100,000)
9. 1.00 Southern Ontario (10-24,999)

- Car ownership by size and location of municipality is ranked as follows:

1. 1.60 Metro Region (10-24,999)
2. 1.41 Northern Ontario (25-49,999)
3. 1.38 Northern Ontario (10-24,999)
4. 1.35 Metro Region (50-100,000)
5. 1.29 Metro Region (25-49,999)
6. 1.22 Southern Ontario (50-100,000)
7. 1.05 Southern Ontario (25-49,999)
8. 1.00 Southern Ontario (10-24,999)
9. 0.91 Northern Ontario (50-100,000)

- Lack of parking spaces for visitors was identified as the single largest parking problem in the resident survey. Of the municipalities responding in the municipal survey, more than half have no specific bylaw requirement for visitor parking.

FORM	NO BYLAW REQUIREMENT FOR VISITORS (as percentage of municipalities responding)
Twnhs. Rental	70.2%
Twnhs. Condo	66.0%
Apart. Rental	62.5%
Apart. Condo	63.0%

- Although some of the municipalities that do not have specific visitor parking requirements claim to have made an allowance for visitors in the total requirements, the municipal survey shows that of the municipalities without a specific visitor requirement, many have a total requirement that is even below the resident demand identified in the resident survey.

FORM	AVERAGE RESIDENT DEMAND	TOTAL MUNICIPAL REQUIREMENT BELOW RESIDENT DEMAND (as percentage of respondents that do not have visitor requirement)
Twnhs. Rental	1.33	42.4%
Twnhs. Condo	1.57	93.5%
Apart. Rental	1.23	16.7%
Apart. Condo	1.51	89.7%

These percentages clearly indicate the major reasons for the visitor parking problem, particularly in condominium projects: not only does the total parking requirement in most cases not include any allowance for visitor parking, it does not even meet the resident parking demand.

- A frequent comment in the resident survey related to the use of visitor parking spaces by residents. To an extent, this reflects the already discussed shortage of resident spaces, but also the lack of *short term* resident spaces in a convenient location in relation to their dwelling units.

- 22.9% of the municipalities responding do not have special parking requirements for senior citizen accommodation. Of those that do, the requirement ranges from 0.16 (1 for six dwelling units) to 1.5, with an average requirement of 0.67 per unit. 35.1% of the municipalities with specific senior citizen standards have requirements of 1.00 or higher, clearly far in excess of demand.

RANGE OF PARKING DEMAND

As discussed in the previous subsection, the number of definite relationships between parking demand and various factors is smaller than anticipated.

A range of parking demands related to housing form, form of tenure and size of dwelling unit and based on the interpretation of the survey results is presented below. In most instances, a municipality can expect that the effective parking demand for various conditions is within this range at this time.

Range of Resident Parking Demand

- Townhouse Rental:

2 Bedroom	1.0-1.4
3 Bedroom	1.2-1.6
4 Bedroom	1.4-1.8

- Townhouse Condominium:

2 Bedroom	1.2-1.6
3 Bedroom	1.4-1.8
4 Bedroom	1.6-2.0

- Apartment Rental:

1 Bedroom	1.0-1.2
2 Bedroom	1.1-1.3
3 Bedroom	1.2-1.4
4 Bedroom	1.3-1.5

- Apartment Condominium:

1 Bedroom	1.1-1.3
2 Bedroom	1.2-1.4
3 Bedroom	1.3-1.5
4 Bedroom	1.4-1.6

Range of Visitor Parking Demand

- Townhouse Rental:
  0.20-0.30
- Townhouse Condominium:
  0.15-0.25
- Apartment Rental:
  0.25-0.35
- Apartment Condominium:
  0.20-0.30

Range of Demand for Recreational Vehicle Parking

0.00—0.38

Range of Parking Demand for Senior Citizen Housing

The Ministry of Housing surveyed 95 Ontario Housing Corporation (OHC) senior citizen projects in 1979 to assess the suitability of existing parking standards. Of the 95 projects surveyed, 80 had parking needs that were satisfied by present requirements and 7 expanded their facilities to meet these requirements. The projects were located in London, Ottawa, and medium sized and rural communities in southwestern and central Ontario.

The study recommended that existing standards be maintained since the demand generally fluctuated within the limits of existing standards.

These standards are as follows:

Size of Project	Public Transportation not Available (Parking/D.U.)	Public Transportation Available (Parking/D.U.)
0-30	0.50	0.40
31-60	0.40	0.35
61-100	0.30	0.27
101-150	0.25	0.25
151-200	0.25	0.24
201-250	0.25	0.23

3. PARKING POLICY

POLICY ALTERNATIVES

Parking demand is a very important criterion in determining the amount of parking to be provided in a medium density housing development. It is, however, not the only one.

Particularly from the point of view of the municipality setting requirements which will have an effect over the lifetime of a project, it is essential that other societal needs and trends be considered.

Other needs against which the need for sufficient parking to meet the current demand has to be balanced include:

- the need for affordable housing;
- the need for a quiet residential environment;
- the need for play areas without interference of traffic; and
- the need for preserving agricultural land.

Among the possible trends which might affect the ownership and/or car usage are:

- an increase in alternative transporation means such as car pooling, bicycling, walking;
- an expansion of transit systems and an increase in transit ridership;
- a shift to smaller cars;
- a move to mixed use developments and multi-use sub-nodes;
- an increase of residential uses in core areas; and
- a curtailment of peripheral shopping facilities.

In establishing a parking policy, the municipality can choose among many alternatives of which the following are four distinct concepts.

Alternative A

All required parking on-site, high minimum requirement, no maximum requirement:

- Resident Parking: 100% of demand to be provided on-site;
- Visitor Parking: 100% of demand to be provided on-site; and
- Recreational Vehicle Parking: 100% of demand to be provided on-site.

Alternative B

No parking requirement, marketplace regulator of parking provided off-site or on-site:

- Resident Parking: to be provided at discretion of developer;

- Visitor Parking: to be provided at discretion of developer; and
- Recreational Vehicle Parking: to be provided at discretion of developer.

Alternative C

All required resident parking within easy walking distance of site:

- Resident Parking: on-site or within 150 m of site;
- Visitor Parking: on-site or within 150 m of site; and
- Recreational Vehicle Parking: on-site or within 1,000 m of site.

Alternative D

Combination of off-site and on-site parking facilities:

- Resident Parking: one parking space per unit on-site, remaining resident parking off-site;
- Visitor Parking: off-site; and
- Recreational Vehicle Parking: off-site.

EVALUATION OF ALTERNATIVES

Possible policy alternatives range from requiring the total parking demand on-site to having no requirement for parking provision.

At present, most municipalities are trying to achieve Alternative A, whereas the other extreme, Alternative B, has found no application in Ontario.

The overriding criterion for selecting the most appropriate strategy in any particular situation is the public interest.

The major factors that constitute the public interest in the case of parking standards can be summarized as follows:

- Do the standards hinder or encourage the provision of affordable housing?
- Do the standards worsen or improve the public safety on the site?
- Do the standards increase or lessen traffic hazards on adjacent streets?
- Do the standards permit or discourage an economical use of parking facilities?
- Do the standards increase or diminish the need for police service?
- Do the standards enhance or obstruct the access for emergency vehicles?
- Do the standards encourage or discourage the use of public transportation?

- Do the standards reduce or increase the waste of resources (e.g. land, energy, services)?
- Do the standards improve or lessen the quality of the residential environment (e.g. privacy, noise, air pollution)?

The parking requirements of the various policy options should be evaluated based on these public interest criteria, in order to arrive at an effective municipal parking policy.

Other criteria, such as convenience for residents or visitors, are not municipal concerns per se and should be dealt with through the marketplace.

Alternative A

This alternative scores high on a minimal need for police service and non-interference with traffic on adjacent streets. It performs, however, poorly when judging any of the other factors.

Alternative B

This alternative requires extensive policing. The approach, on the other hand, offers many advantages on the economic side. In the long run, it could lead to a provision of parking facilities that reflect in a dynamic way the effective demand at any time.

Alternative C

This alternative combines most of the advantages of Alternatives A and B. However, there is potential for misuse of the facilities due to increased difficulty to locate spaces for visitors.

Alternative D

This last alternative integrates parts of all the other alternatives. It is realistic in requiring minimal on-site facilities reflecting actual use but at the same time, allows for economical provision of supplementary spaces.

RECOMMENDED STRATEGY

The quality of service required reflects a value system and is a political decision. None of the above alternatives probably should find application throughout a municipality. Locational and other factors determine not only parking demand but also policy characteristics.

In arriving at an effective parking policy for each individual case, the following aspects should be considered:

- A minimal amount of parking for residents (1 space per unit) should be required on-site in all cases save core areas (except for senior citizen dwellings);
- In core areas, a cash-in-lieu contribution to municipal parking facilities could be an option;

- While car ownership will probably continue to increase, car usage, in the long run, will probably decrease. Off-site facilities for second cars or tandem arrangements on-site are adequate in most instances;
- Recreational vehicles should have special parking areas. Off-site facilities are given preference by many residents. The operation of municipal storage areas should be considered;
- Sharing of parking facilities by uses with different peak demands reduces the total parking provision, particularly in core areas or mixed uses areas;
- The provision of parking facilities within walking distance of sites permits the control of traffic within a residential area and the use of the facilities during the day for other uses that are in close proximity, e.g. offices;
- Many public streets adjacent to medium density housing projects can adequately accommodate visitors parking without creating traffic hazards, particularly on weekends during peak demand; and
- Maximum amounts of parking permitted on-site should be stipulated, in order to control traffic that is extraneous to the development and to avoid excessive, unused surface parking lots.

4. DESIGN CONSIDERATIONS

DESIGN OBJECTIVES

Parking problems are very often the result of a misuse of parking facilities due to poor design. Visitors park in driveways because the visitor parking area is hidden, or residents park in visitor parking areas because resident parking areas are in inconvenient locations.

When setting design requirements for parking areas, it should be remembered that vehicular movement and parking is one aspect among many other ones, all concerned with the creation of an enjoyable and efficient residential environment.

Vehicular movement and parking is in conflict with many activities taking place in a residential environment. The design objective, therefore, is to minimize the negative impacts and at the same time, to obtain functional characteristics that improve the operation of the facilities intended for the automobile.

In addition, the design of parking facilities should anticipate changing circumstances, such as an increase or reduction of parking demand over the lifetime of the project, or an increase of smaller cars. Provision for a change at a later date should be made in the initial design.

In particular, the objectives are:

- to provide parking spaces within convenient access of housing units for residents;
- to provide parking spaces in an area easily located by visitors;
- to provide well screened parking spaces for recreational vehicles;
- to obtain parking areas that do not interfere with the visual privacy of dwelling units;
- to plan parking areas that do not have a negative impact on neighbouring properties;
- to arrange parking areas so that no interference with play areas occurs;
- to provide access to parking areas that minimizes pedestrian/vehicular conflict;
- to provide access to parking areas that has regard to noise control;
- to provide parking and access facilities that are safe;
- to provide parking areas that offer security; and
- to plan parking areas so that they can be turned into amenity areas and amenity areas so that they can be converted to parking areas on a temporary (peak demand) or permanent basis.

DESIGN ELEMENTS

For a proper operation of parking facilities in the context of medium density housing, the following design elements deserve particular attention:

- access to parking facilities;
- location of parking facilities;
- types of parking facilities;
- screening of parking facilities; and
- sizes of parking facilities.

Access to Parking Facilities

- The length of access routes for parking facilities should be minimized in order to reduce noise impact and to save land;
- The routing of access drives should avoid direct light from automobile headlights into habitable rooms;
- Access to parking areas for visitors should be identified by signs;
- Lighting of access should avoid direct lighting into habitable rooms or glare to automobile drivers;
- Pedestrian access to parking areas should be well defined by paving material, landscaping and lighting;
- Pedestrian access should be weather protected;
- Pedestrain access should be convenient for the handicapped and for people with carriages and shopping carts;
- Visibility to the sidewalk for automobiles leaving parking areas is essential;
- Access routes should permit easy clearance of snow;
- Access routes should incorporate convenient drop-off points adjacent to housing units or building entrances;
- The routing of access drives should slow down the traffic in a natural way;
- Access routes should not divide open space areas; and
- Steep driveways to individual garages should be avoided (winter use).

Location of Parking Facilities

- No parking should be located directly adjacent to a habitable room window;
- If possible, resident parking spaces should be visible from dwelling units for supervision;
- Visitor parking area should be as close as possible to entrance of project;
- Resident parking should be as close as possible to the dwelling unit, or have a weather protected pedestrian link;
- The entrance to the housing unit or building should be visible from the resident parking area for security reasons;
- The location of the parking areas should not impede access to buildings for deliveries, services and pedestrians; and
- Recreational vehicle parking areas should be provided as self-contained storage facilities with good security.

Types of Parking Facilities

- Visitor parking spaces should be accommodated in surface parking areas separate from resident parking areas;
- The use of surface parking areas for residents should be minimized to increase available amenity areas and to achieve lower building profiles so that the paved area does not exceed one-third of the site area;
- Landscaping should be used to divide large surface lots into smaller group parking;
- Simple shapes should be used for surface areas to allow for convenient snow removal;
- Snow storage areas should be incorporated;
- Surface parking lots should have low-level lighting;
- Particular attention should be paid to adequate drainage of surface parking areas to avoid water pockets;
- For house-form developments, preference should be given to individual garages within the units or in grouped arrangements;
- For housing developments in excess of 37 units per hectare (15 units per acre), the majority of resident parking should be provided in underground garages or above ground parking structures;
- All underground parking should be adequately ventilated and lighted;
- Above ground structures that are in the view of residential units should have a landscaped roof-deck;

- Parts of surface parking areas should be designed in such a way that they can be easily converted to amenity areas in the future; and
- Parts of amenity areas should be designed in such a way that they easily can be converted to parking areas in the future.

Screening of Parking Facilities

- Vehicular circulation and parking areas should be screened from view from outside the site by walls, vegetation, berms or a screen/fence;
- Surface parking lots should be landscaped to soften the negative visual impact within the site, including view from above with trellis;
- Not more than 12 spaces should be in a row without an intervening landscaped area;
- Natural amenities of the site should be preserved and incorporated in the siting of parking facilities (topography, trees, shrubs); and
- Above ground structures should have opaque screens of sufficient height on each floor to avoid headlight disturbances on adjoining properties.

Sizes of Parking Facilities

- Residential parking spaces should be assigned so that a variety of sizes reflecting the trend to smaller cars can be provided;
- All visitor parking spaces should be of uniform size to allow for flexibility;
- Parking spaces for second resident cars can be provided in tandem arrangement;
- Underground parking garages that have to accommodate recreational vehicles should have a reserved area with additional ceiling height; and
- The parking layout for standard sized parking spaces should be easily convertible to spaces for smaller cars in the future.

5. IMPLEMENTATION

PRINCIPLES

Most municipalities implement their parking policy exclusively through the zoning bylaw. Some municipalities, however, prefer implementation through the site plan approval process guided by standards based on Council resolution. And in some cases, the draft plan approval process is used to implement parking requirements that cannot be regulated through the zoning bylaw.

It is important that municipalities consider the most effective method for implementing their standards. The issue is primarily one of balancing the need for certainty with the need for flexibility.

In addition, the questions of public input and equity have to be considered.

The following principles should be followed in establishing an implementation strategy:

- Parking standards that affect the economics of a housing project (e.g. amount of parking) should be regulated through a mechanism that creates *certainty*;
- Parking standards that potentially could have an impact on adjacent properties (e.g. screening along lot line) should be formulated through a process which includes *public participation*;
- Parking standards that affect the design of the project should be implemented through a tool that offers *flexibility*;
- Parking standards that apply to similar circumstances should be implemented in a similar manner to achieve *equity*; and
- Parking standards that have to fit a particular circumstance should be controlled through a mechanism that offers *adaptability*.

IMPLEMENTATION STRATEGY

The achievement of a balanced implementation necessitates the integration of the various available implementation tools in an intelligent manner.

The efficient, economical and equitable provision of parking facilities, therefore, can only be obtained if the municipality adopts an enlightened implementation strategy that considers all the available procedures.

The following course of action is recommended:

- The required parking amount should be spelled out in a comprehensive zoning bylaw under Section 39 of *The Planning Act*, R.S.O. 1980. This offers not only certainty to the developer and to the neighbouring residents and users, but it also permits full accountability in a public participation process;

- The required parking amount in the zoning bylaw should reflect the effective demand of various housing types, unit sizes, zones within a municipality and other factors that affect the demand;
- Parking design standards should be removed from the zoning bylaw and regulated through the *site plan approval process* under Section 40 of *The Planning Act* to allow for flexibility at the design stage, and where this is not applicable, as a condition of draft subdivision plan approval pursuant to Section 36 of *The Planning Act;*
- Clear design principles should be adopted as a basis for the site plan approval process under Section 40 of *The Planning Act;*
- Variations in parking requirements reflecting various forms of tenure should be regulated through development agreements in the draft subdivision plan approval process under Section 36 of *The Planning Act* based on clearly enunciated policies (e.g. condominium vs. rental);
- Where consent is given by a Committee of Adjustment under Section 49 of *The Planning Act*, parking requirements that cannot be regulated through zoning should be controlled through conditions set by the Committee registered on title; and
- Development densities should be considered in linkage with improved parking facilities (e.g. underground parking vs. surface parking), and the use of bonus provisions for increased densities should be considered.

6. AN APPROACH TO THE DETERMINATION AND REVIEW OF PARKING STANDARDS

There is no magic formula to the establishment of parking standards. Any approach a municipality undertakes must be flexible enough to embrace a wide range of changing and special circumstances. The success of this flexible approach depends upon an understanding of all the forces and factors that affect demand, design, policy and implementation, as well as the interaction between these aspects.

The following step-by-step process is suggested as a guide to municipalities for establishing parking requirements for medium density housing projects. The approach can be applied to individual projects, but as explained elsewhere, it is recommended that parking standards be established in a comprehensive manner covering all possible conditions with a coherent policy for the whole of the municipality.

The following page indicates in a schematic manner, the major components and the process.

1. Determine Generic Development Characteristics

The purpose of the first step is to determine generic development characteristics that occur in typical housing projects in the municipality for which standards have to be developed:

- Forms of housing;
- Forms of tenure;
- Unit mix (size of units);
- Level of affluence of occupants (luxury units vs. subsidized units);
- Location in relation to other uses (sharing of parking facilities); and
- Types of roads on which projects have frontage (arterial vs. local roads).

2. Review Parking Experience Elsewhere

Other jurisdictions have often similar development characteristics and their parking standards may have applicaton in the municipality:

- Review parking literature (see Appendix A);
- Review municipal parking studies;
- Review parking bylaws; and
- Exchange information with officials in other municipalities.

DETERMINATION OF PARKING STANDARDS

3. Survey Parking Demand and Problems in Key Existing Developments

As a basis for the determination of the range of demand specific to the municipality, it is recommended that surveys of existing typical developments be undertaken:

- Identify residential parking problems;
- Relate resident car ownership to development factors;
- Determine peak visitor parking demand; and
- Investigate off-site parking opportunities.

4. Determine Range of Demand

Determine likely range of demand for parking on the basis of:

- Literature review (See Appendix A);
- Specific surveys undertaken in the municipality; and
- Outline of factors affecting demand in Section 2.

5. Establish Parking Policy

After determining the number of spaces that will satisfy the demand, develop policy on level of service to be provided, in particular:

- Minimum requirement for on-site resident parking facilities;
- Level of on-street parking for visitors;
- Municipal involvement in providing recreational vehicle parking;
- Level of sharing of parking facilities between uses with different peak demands; and
- Maximum walking distance for off-site resident parking.

6. Determine Implementation Approach

On the basis of criteria established in step 5, establish most effective implementation method by assigning parking aspects to be regulated to the various implementation tools:

- Zoning bylaws;
- Site plan approval process;

- Draft subdivision plan approval process; and
- Consent approval process.

7. Establish Subdivision and Committee of Adjustment Policies

Develop detailed policies on parking standards that will be regulated through agreements under Section 36 or through conditions to be registered on title under Section 49 of *The Planning Act.*

8. Determine Zoning Bylaw Requirements

Spell out parking requirements that are proper concerns of the zoning bylaw, specifically:

- Number of resident parking spaces;
- Number of visitor parking spaces or cash-in-lieu contributions;
- Required screening of parking facilities from surrounding properties; and
- Bonus policies (e.g. higher densities for enclosed parking facilities).

9. Develop Design Guidelines

Establish parking design guidelines that will guide the administration of the site plan approval process under Section 40 of *The Planning Act* in a consistent manner, particularly with regard to:

- Type of parking facilities (surface, underground, parking structure, individual garages, etc.);
- Location of resident parking facilities in relation to dwelling units (1 space, 2 spaces, short-term spaces);
- Location of visitor parking facilities in relation to street and dwelling units;
- Type of landscaping; and
- Vehicular and pedestrian circulation on site.

10. Monitor Parking Standards

Monitor at regular intervals the adequacy of parking standards through parking facilities utilization studies. Monitoring may reveal inadequacies both in the standards applied and the policies formulated.

APPENDIX A: SELECTED ANNOTATED BIBLIOGRAPHY

Parking World Publications

July 1980 Issue

In an article by Richard F. Roti, "Small Cars in the Auto Population", he cites that as a result of size evolution (larger to smaller), parking stall size will decrease from the present 8.5′ x 18′ to 7.5′ x 15′. His down sizing estimate indicates a 75% small car population by 1985.

November 1979 Issue

Contains an article dealing with methods for determination of the ratios of small, medium and large vehicles as they apply to size and number of spaces in parking lots. Recommendation is for a 20%-20%-20% small-medium-large split with remaining 40% left to owners' discretion.

October 1979 Issue

In a study in Philadelphia by Joseph P. McGee and Allan M. Voorhees, the results of resident permit parking on adjacent streets posted with 2 hour maximum parking signs for non-residents are described.

October 1979 Issue

Outlines an experiment in Beacon Hill, Boston where a real estate, construction and management firm offers parking spaces to condominium residents for $8,500.00 per space. The purchase price of the condominium unit does not include parking space.

June 1979 Issue

Relates the sales of small cars, imports and subcompacts to large cars for the first four months of 1979. Results indicate small car sales up 39%, large cars down 16%.

May 1979 Issue

Illustrates by example, in Madison, Wisconsin, the results of an ordinance to prohibit the owner to rent parking spaces to anyone other than residents and their guests.

Highway Research Record Publications (HRR)

HRR #474, *Parking Policy as an Integral Part of Urban Development Objectives,* Ralph E. Jackson, pp 7.

This paper concludes that parking policy is a strong and controllable tool available to land use and transportation planners in accomplishing urban development objectives.

Transportation Research Record Publications (TRR)

TRR #605, *Applicability of Electric Cars to Urban Driving*, William Hamilton, pp 4.

Based on Hamilton's projections of electric car acceptance and the resultant population, it becomes necessary for households to have at least one off-street parking space to facilitate recharging.

TRR #601, *An Approach for Maximizing the Capacity of Self Serve Parking Facilities*, Jason C. Yu, pp 38.

This study has developed a simple and practical tool for maximizing storage capacity of parking facilities, specifically for larger parking lots.

Institute of Transportation Engineers Publications (ITE)

ITE 48th Annual Meeting, *Analysis of Automobile Size, Frequency Distribution and Parking Stall Design Criteria*, Theodore Von Briesen & Kenneth A. Goon

Concludes any parking lot with more than one and one half acres of usable parking area can use mixed stall spaces and advocates using only two stall sizes, 9′ x 20′ and 8′ x 16′ or 7.5′ x 15′ as the vehicle population of smaller vehicles increases. More and more of the larger stall spaces can be replaced with the smaller size. It is also important to design for efficient stall size conversion so as to always maximize use of available space.

ITE Journal, November 1980 Issue, *Parking Design for Down Sized Cars*, Richard I. Strickland, pp 18.

As a result of continued down sizing of cars, Strickland feels that an increase in capacity of about 16% from use of a 55′ rather than an existing 60′ parking unit is possible. Design should consider efficient layouts for the down sized cars of the 1990's. Proper mixing of stalls can result in a 25% gain. Example of remarking a 1,000 car lot to provide 610 sub-compact spaces and 660 regular spaces increases total available number of stalls to 1,270.

Segregated sub-compact areas provide an increase of 40% over standard car spaces.

ITE Journal, November 1980 Issue, *Now is not the Time to Reduce Parking Dimensions*, James Hunnicutt

Describes mixed stall lots. A) Lack of control — large cars continue to try to use small spaces thereby blocking aisles and taking up two spaces. B) Percentage of small car population seems to vary drastically from centre to centre. C) Most drivers do not know their wheel base dimensions and so would be confused by classification signing. D) Vast majority of American people do not believe that there is an energy shortage and once they are used to higher fuel prices, big cars become more efficient. The cars will grow larger.

Other Publications

A Survey of Traffic and Parking at Apartments within Metropolitan Toronto, Recon Research Consultants Limited, September 1968

Lists by type and size of building and area (central, inner, intermediate and outer), the number of vehicles. Equates costs for indoor/outdoor parking, parking demands by percentage or number of units and parking arrangements, spaces and trips by proximity to transit, weekend visitors and tenant stall size requirements.

City of Sudbury, An Analysis of Parking for Multiple Dwellings, Sudbury Planning Board, 1971

Analysis of requirements for residential housing from private dwellings to highrise. Considers guest requirements, recreational vehicle requirements and recreational equipment requirements. Describes and recommends design features to best accommodate these requirements. Also covers requirements peculiar to nursing, convalescent and old age homes.

Parking Areas Advisory Document, Klein and Sears for Canada Mortgage and Housing Corporation, 1980

This advisory document is one of a series of documents to be used in conjunction with "Site Planning Criteria". It supplements the performance standards of "Site Planning Criteria" by explaining and illustrating more extensively the factors to be considered in planning and designing parking aspects in the residential environment.

Parking for Apartments, Urban Design Guidelines, City of Calgary Planning Department, 1978

The development and design guidelines deal both with quantity and quality of parking. The report undertakes a re-evaluation of the existing bylaw parking requirements and establishes guidelines on how to handle parking on apartment sites.

Parking Lot Landscape Development, Gary O. Robinelle, Environmental Design Press, 1976

The book is a collection of guidelines, criteria, plant lists, plans, details, examples, and case studies on landscape design for parking areas.

Parking Standards Study, Borough of Scarborough, Municipal Planning Consultants, 1975

The report is based on a survey of residents in multiple accommodation types in condominium, rental and public ownership. The survey reveals a lack of parking spaces, as well as a misuse of the existing facilities by residents.

Parking Survey for Senior Citizen Housing, Ontario Ministry of Housing, Technical Services Division, 1979

Survey of 95 senior citizen projects in areas chosen to represent a good mixture of urban and rural communities containing several projects that reported parking difficulties.

Planning and Design of Townhouses and Condominiums, Robert Engstom & Marc Putman, Urban Land Institute, Washington, 1979

Deals with parking aspects, planning and design as they pertain to garages (underground and attached parking areas) on-street and off-street, space for peripheral parking, apron parking and recreational vehicle parking.

Residential Design Guidelines, City of Ottawa, Planning Branch, 1977

The guidelines discuss the issues and principles of residential and mixed use planning through the use of examples and illustrative sketches. On-site vehicular movement and parking is discussed in detail.

Residential Parking Study, City of Mississauga Planning Department, 1977

The study reviews the parking standards for multiple family and apartment dwellings. Three extensive surveys form the basis for the recommendations on parking standards designed to reflect development goals and policies and adequately serve expected future needs.

Site Planning for Cluster Housing, Richard Unterman & Robert Small, Van Nostrand Reinhold, N.Y., 1977

Recommends design of lots that are least costly and damaging to open space. Deals with street access court parking, separate lots and separate structures as site planning problems.

The Dimensions of Parking, published jointly by Urban Land Institute and National Parking Association, 1979

Discusses requirements for lot and garage parking in commercial and residential situations.

APPENDIX B: RESULTS OF MUNICIPAL SURVEY

Existing municipal parking standards, spelled out in zoning bylaws, are requirements and do not necessarily correspond to demand. However, it would be inappropriate to totally disregard existing requirements, since many of them have been arrived at through trial and error and after many modifications, and are some reflection of effective demand. Existing standards are at the very least, a good control device.

The major results were as follows:

RESIDENT PARKING REQUIREMENTS
(Vehicles per Dwelling Unit)

FORM	RANGE	AVERAGE
Twnhs. Rental	0.94-1.50	1.29
Twnhs. Condo	0.94-2.00	1.33
Apart. Rental	1.00-2.00	1.29
Apart. Condo	1.00-2.00	1.27

VISITOR PARKING REQUIREMENTS
(Vehicles per Dwelling Unit)

FORM	RANGE	AVERAGE
Twnhs. Rental	0.00-0.50	0.08
Twnhs. Condo	0.00-0.60	0.10
Apart. Rental	0.00-1.00	0.13
Apart. Condo	0.00-0.50	0.11

TOTAL PARKING REQUIREMENTS
(Vehicles per Dwelling Unit)

FORM	RANGE	AVERAGE
Twnhs. Rental	1.00-2.00	1.39
Twnhs. Condo	1.00-2.60	1.41
Apart. Rental	1.00-2.50	1.54
Apart. Condo	1.00-2.50	1.42

BYLAW PARKING REQUIREMENTS

REGION	MUNICIPALITY	SINGLE FAM. R	SINGLE FAM. V	SEMI DET. R	SEMI DET. V	RENT. TOWNH. R	RENT. TOWNH. V	CONDO. TOWNH R	CONDO. TOWNH V	RENT. APT. R	RENT. APT. V	CONDO. APT. R	CONDO. APT. V	SENIOR CITIZEN R	SENIOR CITIZEN V
CENTRAL ONTARIO	AJAX	2		2		1.5		1.5		1.5		1.5			
	ANCASTER	2		2		2		2	0.6	2	0.3	2	0.3	0.4	
	BARRIE	1		1		1.25		1.25	0.17	1.25		1.25		0.25	
	BRANTFORD	1	1	1	1	1	0.5	1	0.5	1	0.5	1	0.5	0.25/0.33	
	CAMBRIDGE	1		1		1.1.5		1.1.5		1.25		1.25		0.5	
	COBOURG	1		1		1.5		1.5		1.25		1.5		0.25	
	COLLINGWOOD	1		1		1	0.25	1	0.25	1	0.25	1	0.25	1	
	DUNDAS	1		1		1.25		1.25		1.25		1.25		1.25	
	EAST GWILLIMBURY	1		1.5		1.5		1.5		1.5		1.5		0.25	
	GRIMSBY	1		1		1.5		1.5		1.5		1.5		1.5	
	HALDIMAND-NORFOLK	2		2		2		2		1.5		1.5		1.5	
	HUNTSVILLE	1		1		1.3	0.15	1.3	0.15	1.35	0.25	1.35	0.25		
	LINCOLN	1		1		1.5	0.5	1.5	0.5	2.0	0.5	2.0	0.5	0.5	
	MARKHAM	1		1		1	0.25	1	0.25	1	0.25	1	0.25	0.25	
	MIDLAND	1		1		1		1		1	0.25	1	0.25	0.5	
	NEWMARKET	1		1		1.5		1.5		1.5		1.5			
	NIAGARA FALLS	1		1		1.4		1.4		1.4		1.4			
	ORILLIA	1		1		1	0.25	1	0.25	1	0.25	1	0.25	0.25	
	PELHAM	1		1		1	0.5	1	0.5	1	0.5	1	0.5	0.5	
	PICKERING	1				2		2		1.75		1.75		0.25	
	PETERBOROUGH	1		1		1		1		1.1	0.5	1.25	0.5	0.25	
	PORT COLBORNE	1		1		1		1		1		1		1	
	PORT HOPE	1		1						1.5	1			1	0.25
	RICHMOND HILL	1		1		1.25	0.2	1.25	0.2	1.25	0.2	1.25	0.2		
	SIMCOE	1		1		1		1		1		1			
	STONEY CREEK	1		1		1.5		1.5		1.25		1.25		1.25	
	THOROLD	1		1		1.5		1.5		1.5		1.5		1.5	
	WATERLOO	1		1		1.5		1.5		1.25		1.25			
	WHITBY	2		2		1.5	0.5	1.5	0.5	1.5	0.5	1.5	0.5		
	WHITCHURCH-STOUFFVILLE	1		1		1.5		1.5		1.5		1.5		1.5	
SOUTH-WESTERN ONTARIO	CHATHAM	1		1		1.25		1.25		1.25		1.25		1.25	
	LEAMINGTON	1		1		1.5		1.5		1.5		1.5		1.5	
	OWEN SOUND	1		1		0.94	0.31	0.94	0.31	0.94	0.31	0.94	0.31	0.25	
	SARNIA	1		1		1.25		1.25		1.25		1.25		0.3	
	STRATFORD	1		1		1.5		1.5		1.5				0.33	
	WALLACEBURG	1		1		1.25		1.25		1.25		1.25		0.33	0.08
	WOODSTOCK	1		1		1.4	0.2	1.5	0.2	1.2/	0.2	1.2/4	0.2		
EASTERN ONTARIO	BELLEVILLE	1		1		1.25		1.25		1.25		1.25		0.25	
	BROCKVILLE	1		1		1		1		1		1		1	
	KANATA	2		2		1.5		1.5		1.25		1.25			
	KINGSTON	1		1		1.4		1.4		1.4		1.4		0.16/0.25	
	NEPEAN	1		1		1.15	0.15	1.35	0.15	1.15	0.15	1.35	0.15		
	PEMBROKE	1		1		1.25		1.25		1.25		1.25		0.25	
	VANIER	1		1		1		1		1.2		1.2		0.16	
NORTHERN ONTARIO	ELLIOT LAKE	1		1		1.5		1.5		1.5		1.5		1.5	
	KIRKLAND LAKE	1		1		1		1		1.25		1.25		0.25	
	SAULT STE. MARIE	1		1		1	0.25	2	0.25	1	0.25	1.25	0.25	0.25	
	TIMMINS	1		1		1	0.2	1	0.2	1	0.2	1	0.2	0.2	

R=Resident
V=Visitor

PARKING DIMENSIONS

REGION	MUNICIPALITY	Bylaw Requirements (Right Angle/Parallel) Min. Area m²	Min. Width m	Min. Length m	Min. Aisle m
CENTRAL ONTARIO	AJAX	16.70	2.70	6.00	6.70
	ANCASTER	16.47	2.75	6.10	6.71
	BARRIE	18.00	3.00	6.00	
	BRANTFORD	18.00	3.00	6.00	
	CAMBRIDGE	15.90	2.90	5.50	4.00-7.00
	COBOURG	19.00			6.00
	COLLINGWOOD	18.60	3.00	6.20	6.00
	DUNDAS		2.70/2.70	6.00/6.70	6.00/5.50
	EAST GWILLIMBURY	18.58	3.05	6.10	6.10
	GRIMSBY	18.50	3.00	6.00	
	HALDIMAND-NORFOLK	18.00/18.90	3.00/2.70	6.00/7.00	
	HUNTSVILLE	16.50	2.50		
	LINCOLN	16.80	2.80	6.00	
	MARKHAM	18.00	3.00	6.00	6.00/3.00
	MIDLAND	13.75	2.50	5.50	7.30
	NEWMARKET		2.75	6.10	6.10
	NIAGARA FALLS		3.00/3.00	6.00/7.20	7.20/3.00
	ORILLIA	16.00	2.70/2.50	6.00/6.50	6.50/3.50
	PELHAM	15.00	2.74	5.50	6.00
	PICKERING	18.00			6.50/3.80
	PETERBOROUGH		2.70/3.04	5.70/6.70	6.40
	PORT COLBORNE	23.00			
	PORT HOPE	16.25	2.50	6.50	3.00
	RICHMOND HILL	16.74 16.37	2.75 2.44	6.10 6.71	6.71 3.66
	SIMCOE	18.60	3.05	6.10	
	STONEY CREEK	18.00	3.00	6.00	9.00
	THOROLD	27.00	2.70	5.50	2.40
	WATERLOO		3.00	6.00	6.00/7.00
	WHITBY	18.60	2.70	6.00	6.00
	WHITCHURCH-STOUFFVILLE	18.60	3.05	6.10	
SOUTH-WESTERN ONTARIO	CHATHAM	27.90	3.05	9.15	
	LEAMINGTON	18.60/21.40	3.05/3.05	6.10/7.01	6.10/4.58
	OWEN SOUND	15.00	2.50	6.00	6.00
	SARNIA	15.12	2.75	5.50/6.70	6.00/3.70
	STRATFORD		2.80/2.40	6.00/6.70	
	WALLACEBURG		3.05	6.10	3.05-9.14
	WOODSTOCK	16.74/18.41	2.75/2.75	6.10/6.71	7.62/6.1, 3.05
EASTERN ONTARIO	BELLEVILLE		2.40/2.40	6.00/7.00	7.00/3.90
	BROCKVILLE		3.05	6.10	
	KANATA	15.60	2.60	6.00	6.00
	KINGSTON	16.20	2.70	6.00	
	NEPEAN		2.75	6.10	6.10
	PEMBROKE	18.60			6.10
	VANIER	15.50	2.60		6.00
NORTHERN ONTARIO	ELLIOT LAKE	18.58			
	KIRKLAND LAKE	16.00	2.50	6.40	5.00-7.50
	SAULT STE. MARIE	17.76 21.76	2.74 2.74	5.79 7.93	7.63 3.05
	TIMMINS	18.00	3.00	6.00/7.00	6.80

APPENDIX C: RESULTS OF RESIDENT SURVEY

The resident survey was designed to determine resident, visitor and recreational vehicle parking demand, as well as common parking problems.

The questionaires were analyzed by computer to establish relationships between parking demand and various factors outlined below:

- Housing form
- Form of tenure
- Size of dwelling unit
- Household income
- Transit proximity
- Transit frequency
- Travel mode (home-work)
- Size of municipality
- Location of municipality
- Parking supply

The major results of the resident survey were as follows:

HOUSING FORM & TENURE
(Resident Vehicles per Dwelling Unit)

FORM	CARS	TRUCKS/ VANS	REC. VEH.	OTHER	TOTAL
Twnhs. Rental	1.08	0.19	0.01	0.05	1.33
Twnhs. Condo	1.34	0.09	0.04	0.06	1.57
Apart. Rental	1.04	0.12	0.04	0.03	1.23
Apart. Condo	1.36	0.13	0.00	0.02	1.51

SIZE OF DWELLING UNIT
(Resident Vehicles per Dwelling Unit)

SIZE	CARS	TRUCKS/ VANS	REC VEH.	OTHER	TOTAL
1 Bedroom	1.00	0.09	0.02	0.07	1.18
2 Bedroom	1.06	0.14	0.04	0.01	1.25
3 Bedroom	1.24	0.14	0.03	0.05	1.46
4 Bedroom	1.11	0.22	0.00	0.00	1.33

HOUSEHOLD INCOME
(Resident Vehicles per Dwelling Unit)

INCOME	CARS	TRUCKS/ VANS	REC. VEH.	OTHER	TOTAL
Under $10,000	0.87	0.20	0.07	0.00	1.14
$10,000-$14,999	1.11	0.11	0.01	0.03	1.26
$15,000-$19,999	1.12	0.21	0.03	0.06	1.42
$20,000-$24,999	1.16	0.15	0.04	0.02	1.37
$25,000-$29,999	1.21	0.09	0.02	0.05	1.37
Over $30,000	1.39	0.10	0.02	0.05	1.56

TRANSIT PROXIMITY
(Resident Vehicles per Dwelling Unit)

WALKING TIME	CARS	TRUCKS/ VANS	REC. VEH.	OTHER	TOTAL
1 Minute	1.26	0.13	0.03	0.03	1.45
2 Minutes	1.06	0.14	0.03	0.04	1.27
3 Minutes	1.20	0.13	0.00	0.05	1.38
4 Minutes	1.07	0.14	0.03	0.07	1.31
5 Minutes	1.05	0.15	0.02	0.03	1.25
6-9 Minutes	1.30	0.09	0.06	0.03	1.48
10-14 Minutes	1.10	0.15	0.00	0.10	1.35
Over 15 Minutes	1.00	0.25	0.00	0.00	1.25

TRANSIT FREQUENCY
(Resident Vehicles per Dwelling Unit)

AVERAGE FREQUENCY	CARS	TRUCKS/ VANS	REC. VEH.	OTHER	TOTAL
5-9 Minutes	1.33	0.08	0.00	0.17	1.58
10-14 Minutes	1.50	0.05	0.09	0.00	1.64
15-19 Minutes	1.01	0.12	0.01	0.02	1.16
20-29 Minutes	1.30	0.13	0.02	0.04	1.49
30-39 Minutes	1.20	0.19	0.06	0.06	1.51

TRAVEL MODES (HOME-WORK)
(In Percentage of Population)

MODE	1 VEHICLE OWNED	2 VEHICLES OWNED	3 VEHICLES OWNED
Car/Van	70%	83%	100%
Transit	16%	8%	0%
Walking	10%	7%	0%
Other	4%	2%	0%

SIZE AND LOCATION OF MUNICIPALITY (Resident Vehicles per Dwelling Unit)

SIZE/ LOCATION	CARS	TRUCKS/ VANS	REC. VEH.	OTHER	TOTAL
Northern Ontario					
10-24,999	1.38	0.38	0.38	0.00	2.14
25-49,999	1.41	0.23	0.06	0.07	1.77
50-100,000	0.91	0.18	0.01	0.01	1.11
Southern Ontario					
10-24,999	1.00	0.00	0.00	0.00	1.00
25-49,999	1.05	0.16	0.02	0.07	1.30
50-100,000	1.22	0.08	0.04	0.02	1.36
Metro Region					
10-24,999	1.60	0.00	0.00	0.07	1.67
25-49,999	1.29	0.07	0.00	0.21	1.57
50-100,000	1.35	0.11	0.00	0.04	1.50

PEAK VISITOR PARKING DEMAND BY SIZE OF PROJECT (Vehicles per Dwelling Unit) 4 Hr. Periods on Weekends

FORM	NUMBER OF UNITS PER PROJECT					
	0-25	25-50	50-75	75-100	100-150	150+
Twnhs. Rental	0.48	0.40	0.36	0.29	0.33	0.25
Twnhs. Condo	0.53	0.33	0.37	0.50	0.46	0.33
Apart. Rental	0.40	0.52	0.46	0.57	0.24	—
Apart. Condo	—	0.33	0.33	—	0.41	—

VISITOR PARKING DEMAND BY SIZE OF PROJECT AND HOUSING FORM (Average of Weekend 4 Hr. Periods)

FORM	NUMBER OF UNITS PER PROJECT						
	0-25	25-50	50-75	75-100	100-150	150-200	200+
Twnhs. Rental	0.27	0.21	0.17	0.24	0.23	—	0.18
Twnhs. Condo	0.29	0.19	0.21	0.32	0.30	0.16	0.18
Apart. Rental	0.22	0.28	0.25	0.44	0.15	—	—
Apart. Condo	—	0.19	0.27	—	0.23	—	—

VISITOR PARKING DEMAND BY SIZE OF DWELLING (Vehicles per Dwelling Unit) 4 Hr. Periods on Weekends

SIZE	PEAK	AVERAGE
1 Bedroom	0.69	0.42
2 Bedroom	0.29	0.21
3 Bedroom	0.32	0.23
4 Bedroom	0.45	0.30

VISITOR PARKING DEMAND BY TRANSIT PROXIMITY (Vehicles per Dwelling Unit) 4 Hr. Periods on Weekends

WALKING TIME	PEAK	AVERAGE
1 Minute	0.31	0.22
2 Minutes	0.35	0.24
3 Minutes	0.35	0.16
4 Minutes	0.30	0.15
5 Minutes	0.50	0.37
6-10 Minutes	0.45	0.25
11-15 Minutes	0.30	0.21
Over 15 Minutes	0.50	0.33

VISTOR PARKING DEMAND BY TRANSIT FREQUENCY (Vehicles per Dwelling Unit) 4 Hr. Periods on Weekends

FREQUENCY	PEAK	AVERAGE
6-10 Minutes	0.34	0.17
11-15 Minutes	0.37	0.26
16-20 Minutes	0.32	0.23
21-25 Minutes	0.40	0.29
26-35 Minutes	0.36	0.24

VISITOR PARKING DEMAND BY INCOME LEVEL (Vehicles per Dwelling Unit) 4 Hr. Periods on Weekends

HOUSEHOLD INCOME	PEAK	AVERAGE
Under $10,000	0.60	0.37
$10,000-$14,999	0.33	0.21
$15,000-$19,999	0.42	0.26
$20,000-$24,999	0.30	0.21
$25,000-$29,999	0.36	0.27
Over $30,000	0.40	0.25

TOTAL PARKING DEMAND BY DWELLING TYPE & SIZE (Vehicles per Dwelling Unit)

FORM & SIZE		RESIDENT (all veh.)	VISITOR	TOTAL
Twnhs. Rental	3 Bdrm	1.33	0.23	1.56
	4 Bdrm	1.43	0.23	1.66
Twnhs. Condo	3 Bdrm	1.75	0.11	1.86
	4 Bdrm	1.45	0.16	1.61
Apart. Rental	2 Bdrm	1.15	0.29	1.44
	3 Bdrm	1.34	0.29	1.63
	4 Bdrm	1.43	0.16	1.59
Apart. Condo	2 Bdrm	2.00	0.00	2.00
	3 Bdrm	1.37	0.24	1.61
	4 Bdrm	1.64	0.29	1.93

TOTAL DEMAND BY SUPPLY
(Vehicle per Dwelling Unit)

HOUSING FORM	SUPPLY 0-1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2+
Twnhs. Rental	—	1.24	1.31	1.29	—	1.43	1.57	2.33	1.47	1.22	1.60	1.46
Twnhs. Condo	2.27	2.35	1.74	1.41	1.79	1.72	2.20	1.37	1.50	1.79	—	2.03
Apart. Rental	1.49	1.80	1.22	1.42	1.28	1.37	1.86	1.60	2.00	—	—	1.89
Apart. Condo	—	1.00	—	1.52	1.17	1.48	1.70	—	1.97	—	—	—